



## International Journal of Home Science

ISSN: 2395-7476

IJHS 2023; 9(1): 18-20

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Received: 12-11-2022

Accepted: 16-12-2022

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### Quality evaluation of flaxseeds & finger millets incorporated chikki

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#### Abstract

Finger Millet is rich in many nutrients like calcium, protein, iron and other minerals. It is low in fat most of which are unsaturated fats. Flaxseeds reduced the risk of heart disease and type 2 diabetes. They are very easy to incorporate into the diet. Chikki is a popular Indian sweet snack and is consumed by a large section of the population. Since the product is popular among all sections of population in the country. An attempt was made to further enrich with nutraceuticals by incorporating flax seeds & finger millets flour so this research is planned to make use of flaxseed and finger millets in a form of chikki. The objective of the study was to develop & standardize the finger millets & flaxseed chikki; Preliminary trials were done for preparing chikki with incorporation of finger millets and flaxseeds. Sensory and nutritional analysis was done in the study shows that good acceptability of chikki. Acceptable product was further evaluated for nutritional analysis of the chikki. Shelf life studies for period of one month were also studied. Costing was also calculated for chikki. So, research study is proposed to be undertaken to make use of nutritious chikki by all age group of people. The study will be intend on the use of finger millets flour & flaxseed on regular basis by incorporating in chikki which is a ready to eat product which can be consumed in day-to-day basis.

**Keywords:** Flaxseeds, finger millet, peanuts, jaggery, chikki

#### Introduction

Chikki is an edible product which can be prepared by mixing various roasted ground nuts and other ingredients either with sugar and jaggery (Dombe *et al.* 2014) <sup>[5]</sup>. It provides tonnes of nutrients like proteins, minerals and is a good source of iron and copper (Manay and swamy, 2001) <sup>[4]</sup>. Flaxseed is the richest source of oil (40%), of which linoleic and linolenic acids are the major fatty acids. It also contributes 30% of dietary fibre (Bathena *et al.* 2003) <sup>[1]</sup>. Another important vitamin which is supplemented in the body by the intake of groundnuts is vitamin B3 (Brown *et al.*, 2001) <sup>[2]</sup> to an extent of 13.525mg. Consumption of nuts has a positive effect on coronary heart diseases it has been observed that the risk of coronary heart diseases and related cardiovascular diseases (Kelly and Sabate, 2006) <sup>[3]</sup>. Jaggery mostly contains protein, minerals and vitamin and is a rich source of copper and iron (Manay and swamy, 2001) <sup>[4]</sup>. Ragi contains beneficial components such as starch and resistant starch because of which grown in importance as the use of processed foods and also consumer understanding of its health advantages have changed (Wadikar *et al.*, 2007) <sup>[6]</sup>.

#### Material and Methods

Flaxseeds, Peanuts, Jaggery and finger millets were procured from local market of Agra. The study was conducted in Home science department faculty of arts dayalbagh educational institute Agra.

#### Development & standardization of chikki

Chikki was prepared in different ratio. The chikki was prepared using as the base by incorporating flaxseed and finger millets flour peanuts and jaggery. Series of trials was done to standardize the processing of chikki. Ingredients and processing time like cooking time, shape were standardized at the time of formulation. Total two types of chikki were prepared with slight modification of ingredients.

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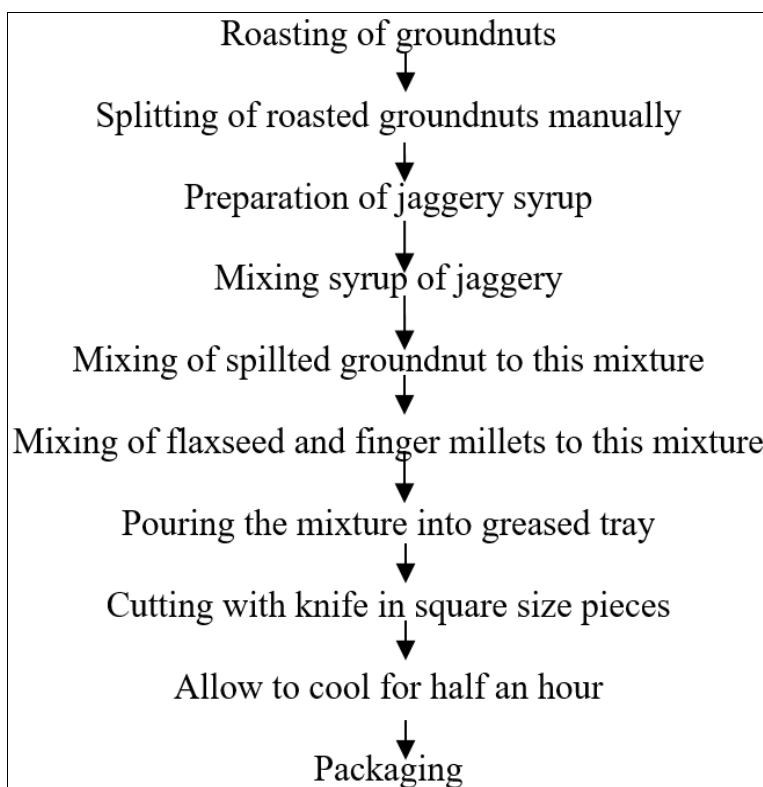
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**Table 1:** Standardization of chikki

Ingredients	Amount	% of chikki
Jaggery	100g	100%
Peanut	50g	50%
Flaxseed	50g	50%
Finger millets	20g	20%



**Preparation of Chikki- Flowchart of chikki Preparation**



**Organoleptic evaluation of chikki was done by 9 point hedonic scale**

Organoleptic characteristics of chikki were evaluated by panel of judges which consists of 50 teachers and students from Arts Faculty.

composition of chikki samples were determined using standard methods. The protein, fat, moisture content, pH, rancidity was determined by the method as described in AOAC

**Results and Discussion S.D**

**Proximate composition of chikki:** The proximate

**Table 2:** Score of organoleptic evaluation of chikki

Characteristics	Control(n=50)	Sample 1(n=50)	Sample 2(n=50)	T test
	Mean S.D	Mean S.D	Mean S.D	
Appearance	6.62 ± 0.96	6.36 ± 0.61	6.94 ± 0.82	1.6
Texture	6.34 ± 0.74	6.34 ± 0.71	6.74 ± 0.91	1.0
Flavor	6.24 ± 1.84	6.22 ± 1.0	6.44 ± 0.91	1.3
Sweetness	6.18 ± 0.77	6.24 ± 0.92	6.86 ± 0.87	1.2
Crunchiness	6.22 ± 0.76	6.28 ± 0.76	6.94 ± 0.82	1.6
Aftertaste	6.24 ± 0.77	6.34 ± 0.69	6.74 ± 0.91	1.0
Overall Acceptability	6.29 ± 0.79	6.88 ± 0.78	6.99 ± 0.95	1.7

The mean value of each parameter is evaluated by panel of judges is presented in table no 1. The table shows the highest

value of sample 2 as compare to sample 1. Sample 2 is accepted by panel of judges.

**Nutritive value of chikki:** The nutritional composition of chikki samples was determined using the standard methods. The protein, fat, moisture content, pH, rancidity was determined by the method as described by (AOAC 2020). Nutritional value of most acceptable product Sample 2.

**Table 3:** Nutritional value

Parameters	Nutritive Values
Protein	12.68%
Fatty acid	24.38%
Rancidity	0.21%
Carbohydrate	56.32%
Ash	1.12%
Moisture	1.18%

**Shelf Life of Product** -The storage stability of based chikki finalized in sensory studied were carried out using low density polyethylene pouches for a period - of 1month at room temperature.

Shelf life testing was done on the basis of room temperature.

**Table 4:** Shelf life testing

Sample Number	Date of Manufacturing	Storage date till in Room	
Sample 1	19/06/2022	19/07/2022	-----
Sample 2	13/07/2022	13/08/2022	-----

Costing of chikki was calculated by adding the cost of ingredients in total by overhead charges. one chikki cost is 2 Rs.

**Table 5:** Costing of Chikki

Particulars	(Rs/Kg)	Quantity(g)	Cost (Rs.)
Jaggery	60	100gm	6
Peanut	80	50gm	4
Flaxseed	150	50gm	6
Finger millets	75	20	2
Overhead	25	---	7.2
No. of chikki	---	20	---
Cost/ per chikki	---	1 chikki	2.07

### Conclusions of the study

The developed chikki was liked by students and teachers of Arts faculty. Some difference was obtained between various characteristics viz, Texture, Appearance/colour, Flavour/Taste, after taste and Crunchiness of chikki. Similarly by means of Hedonic Score Technique, it was concluded that the chikki was accepted by both males and females or it can be eaten by any age group. Processing methods was same for both the samples; at the end sample1 was liked the most as compared to sample 2. So in this way chikki to consume into the popular Indian traditional sweet snack and it can be beneficial as well.

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